Discussion on Data Quality of Hawaii BRFSS 2000

The indicators of data quality can be group into the following:

1. Outcome measures
2. Selection biases with respect to gender, age, and race/ethnicity
3. Missing values
4. Sampling frame coverage

1. Outcome measures

The accuracy of the disposition code assignments is very important because almost all of the outcome measures for data quality are dependent on the disposition codes. Table 1 shows the year 2000 Hawaii BRFSS frequency distribution of the disposition codes taking consideration all possible calls and the household.

Table 1. Count and Percent Distribution of the Hawaii BRFSS 2000 All Sampled Phone Numbers and Household Phones by Disposition Codes

Code	Disposition	All Phones		Household	
		Count	Percent	Count	Percent
01	Completed Interviews	**6016**	**10.70%**	**6016**	**52.9%**
02	Refused	2393	4.30%	2393	21.0%
03	Non-Working	36180	64.60%		
04	Ring No Answer	2526	4.50%		
05	Not a Private Residence	5850	10.40%		
06	No Eligible Respondent	1958	3.50%	1958	17.2%
07	Not Available	0	0.00%	0	0.00%
08	Language Barrier	594	1.10%	594	5.2%
09	Terminated Within Questionnaire	76	0.10%	76	0.7%
10	Line Busy	112	0.20%		
11	Physical / Mental Barrier	343	0.60%	343	3.0%
	Total Phones	56,048	100.00%	11,380	100.00%

The following are the outcome measures that are derived from the disposition codes:

a. Efficiency rate – the completed interviews over all calls or phone samples is the efficiency rate. As shown in table 1, the BRFSS 2000 efficiency rate is 10.7% slightly lower than the National median average of 10.9%.

b. Cooperation rate – the number of completed interview over the number of identified household units with adults. Formula: code 01/(code 01 + code 02 + code 07 + code 08 + code 09 + code 11). The cooperation rate for the BRFSS 2000 is 63.9%, higher than the national median average of 51.3%.

c. CASRO (Council of American Survey Research Organizations) response rate. Basically, the response rate is the number of completes in the numerator over an estimate of the number of eligible units in the denominator. The eligible units in the denominator are disposition codes 01,02,07, and 09 plus an estimate of the number of households among the sample records whose eligibility is undetermined disposition codes 04 and 10. It is assumed that the unresolved numbers contain the same percentage of eligible households as the records whose eligibility or ineligibility are determined. The formula BRFSS CASTRO Formula is

$$\left[\frac{01}{(01+02+07+09)+\frac{(01+02+07+09)}{(01+02+07+09)+(03+05+06+08+11)}\times(04+10)}\right]$$

The CASRO rate for the BRFSS2000 is 67.6%, higher than the National median of 48.9%. An alternative measure to CASRO is the household completion rate shown in column 2 of table 1. The household completion rate is 52.9% higher than the national median of 50.6%. Note, that the alternative measure is only useful if the numbers that are actually ringing are for eligible households and are improperly coded, i.e. assigned with ineligible households (disposition codes 06, 08, 11) rather than to 01, 02, 07 or 09. There is no evidence to that occurring in the State of Hawaii BRFSS.

d. Percent completed from the listed phones. The above measures maybe affected by the telephone system characteristics or the sample design. Another alternative measure of data quality that is less likely affected by the characteristics of the telephone systems and of sample designs is the percent completed as obtained from

the distribution of listed household telephone numbers by disposition codes. The percent completed interviews among the listed phones for the State is 35.4% higher than the median average for the Nation at 33.7% as shown in Table 2.

Table 2. Count and Percent Distribution of the Hawaii BRFSS 2000 Listed Household Phones by Disposition Codes

Code	Disposition	Count	Percent
01	Completed Interviews	**3,340**	**35.4%**
02	Refused	1,147	12.2%
03	Non-Working	2,324	24.6%
04	Ring No Answer	747	7.9%
05	Not a Private Residence	510	5.4%
06	No Eligible Respondent	804	8.5%
07	Not Available	0	0.00%
08	Language Barrier	313	3.3%
09	Terminated Within Questionnaire	28	0.3%
10	Line Busy	13	0.1%
11	Physical / Mental Barrier	209	2.2%
	Total Phones	9,435	100.00%

2. Selection biases with respect to gender and age

Females tend to answer the survey than males as shown in the Table 3 below (53.3%). The State is not alone in this pattern. The national median percent female answering the survey is 58.3%.

Table 3. Percent of Female Answer the Survey in Hawaii

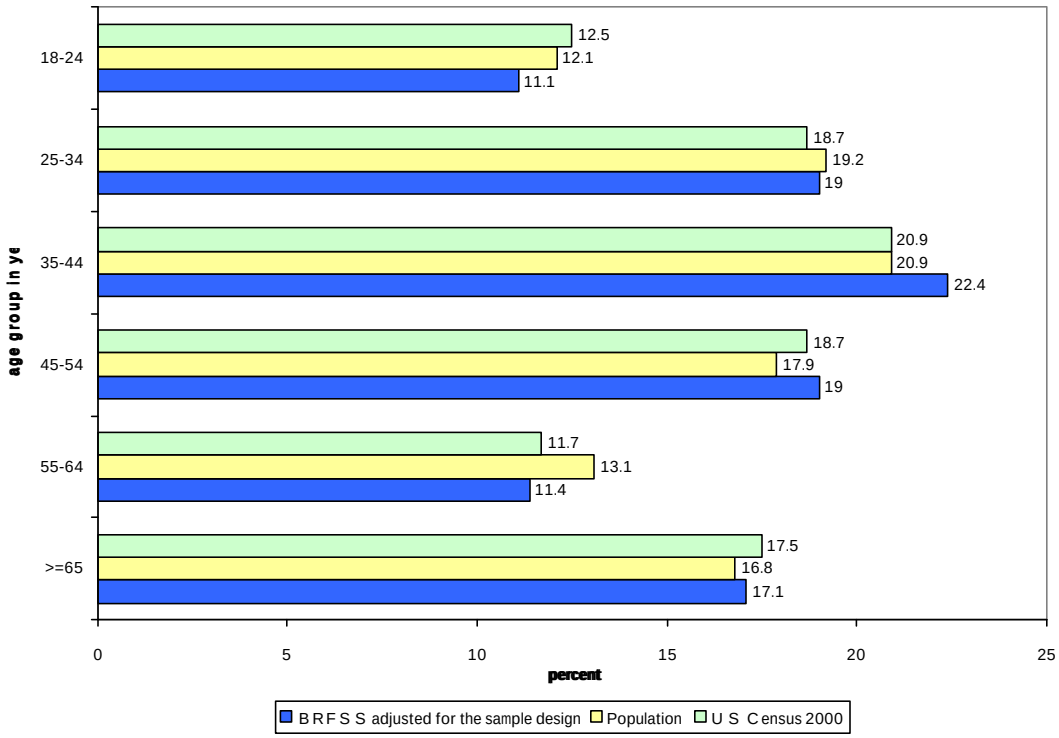
Source	**%**
BRFSS (adjusted for the sample design)	53.3%
Population (Claritas)	49.5%
Population (US Census 2000)	50.2%

The age distribution comparison is shown in the Table 4 below and the accompanying Figure 1.

Table 4. Hawaii age variable percent distribution from the BRFSS adjusted for sample design, the estimated Hawaii Population from Claritas and the US Census

Age group	BRFSS (adjusted for the sample design) %	Population (Claritas) %	Population (US Census 2000) %
18-24	11.1	12.1	12.5
25-34	19.0	19.2	18.7
35-44	22.4	20.9	20.9
45-54	19.0	17.9	18.7
55-64	11.4	13.1	11.7
>=65	17.1	16.8	17.5

Figure 1. Comparison of Age Distribution



There is no standard as to how big the difference should be between the BRFSS and the other source. The difference does not appear to be big enough to worry about any bias. Only one age category, 18-24 years has a difference of more than two percent but less than three percent.

3. Missing values

Except for the income variable which have a combine 16.5% unknown values due to refusal or do not know answers, the rest of the variables have very low percentage of unknown values, most with less than one percent or none. This means that caution should be taken when using the income variable in the analysis. The State is not alone in this high occurrence of unknown income. The National median average percentage of unknown income in the BRFSS 2000 is 13.2%.

4. Sampling frame coverage

In year 2000, the State of Hawaii BRFSS sampling design is 100 percent in compliance with the CDC/BSB recommended Disproportionate Stratified Sampling (DSS) design. In addition, the phone sample is no longer generated by the State. In the past, the phone samples are randomly generated in the Hawaii Department of Health and sent to GTE Hawaii (now Verizon) to identify the status of the generated sample phones, i.e., whether working residential numbers or not. Starting from year 2000, the random phone samples are given to the State from CDC/BSB in partnership with GENESYS as the phone sample generator for the participating states.

In the year 2000 sample design, the phones are grouped as zero block and one-plus block. This grouping is known as the density stratum. "***Zero blocks*** *are hundred blocks with no listed household numbers*. ***One-plus blocks*** *are hundred blocks with one or more listed household numbers*." Most telephone surveys do not include zero blocks and including the zero blocks in the phone samples implies more coverage.

"The weighted percent of completes from zero block numbers is a measure of the additional coverage provided by the BRFSS sampling frame compared to typical telephone survey sampling frame". There seems consistent weighted percent of completes in both zero block and one-plus block between the State of Hawaii and the national median as shown in Table 5.

Table 5. Weighted Percent of Completes in zero block and one-plus block

	One-Plus Block	Zero Block
Hawaii BRFSS	95.8%	4.2%
National Median	97.7%	2.3%